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Mapping the Learning Pathways of Larval Zebrafish through Positively Stimulating Their Reward Pathways Using Paramecium

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Abstract

Zebrafish rely on visual acuity to hunt for prey all of their lives, for this reason, their eyesight develops when they are embryos. The zebrafish in this experiment are between 5 and 20 days old. Once their egg yolks are completely reabsorbed the zebrafish have a need to eat, and only then will they have an interest in eating *Paramecium*. The zebrafishes' eyes will be able to see clearly by 5 days post fertilization as well, so when food is introduced to them, a certain colored light will be simultaneously shined in the same direction as the one the food is coming from.

The purpose of this experiment is to use different colored visual cues to train larval zebrafish into expecting food whenever they are shone. The usage of lights also tests their extraordinary visual abilities. Red lights will be associated with a food reward in one group of larvae, and in the second group, green lights will be associated with a food reward, demonstrating associative learning. The zebrafishes' unconditioned response (eating *Paramecium* when they appear) will be trained into a conditioned response (looking to eat *Paramecium* when the light is shined). After they have been conditioned to respond to these signals, the zebrafishes' brains will be studied to find changes in their neural pathways.

The expected results of this experiment should lead to the fish thinking *Paramecium* are coming at just the glimpse of a light.

Keywords

Authors

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ABSTRACT

Zebrafish rely on visual acuity to hunt for prey all of their lives, for this reason, their eyesight develops when they are embryos. The zebrafish in this experiment are between 5 and 20 days old. Once their egg yolks are completely reabsorbed the zebrafish have a need to eat, and only then will they have an interest in eating *Paramecium*. The zebrafishes' eyes will be able to see clearly by 5 days post fertilization as well, so when food is introduced to them, a certain colored light will be simultaneously shined in the same direction as the one the food is coming from.

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Key Words: Zebrafish, Paramecium, associative learning, unconditioned response, conditioned response

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